CLAIMS

What is claimed is:

1. An inkjet print head chip usable in an inkjet print head, comprising:

a semiconductor substrate having plural switching devices formed therein;

plural heaters provided on upper sides of the switching devices and activated by the plural switching devices to heat ink; and

metal wiring layers formed between the plural heaters and the switching devices which externally radiate some of the heat generated from the plural heaters.

2. The inkjet print head chip of claim 1, further comprising heat radiating parts to which the metal wiring layers are connected.

3. The injet print head chip of claim 2, wherein the heat radiating parts are dimensioned to maximize their surface areas so as to facilitate heat radiation.

4. The inkjet print head chip of claim 2, further comprising heating parts connected to the metal wiring layers and which heat the metal wiring layers.

5. The inkjet print head chip of claim 4, wherein the metal wiring layers transfer the heat generated from the heating parts to the ink surrounding the plural heaters to pre-heat the ink.

6. The inkjet print head chip of claim 4, wherein the plural heaters have two sides and two heat-radiating parts are respectively provided on the sides of the plural heaters.

7. The inkjet print head chip of claim 1, wherein the heaters are formed of TiN.

8. The inkjet print head chip of claim 1, wherein the metal wiring layers are formed of one of aluminum (Al) and an aluminum alloy.

9. The inkjet print head chip of claim 1, wherein the plural heaters are provided in two adjacent linear arrays.

10. The inkjet print head chip of claim 1, wherein the metal wiring layers absorb residual heat after the heaters are deactivated to decrease an amount of the residual heat transferred to the ink and to decrease a time required for the plural heaters to return to a ready state.

11. The inkjet print head chip of claim 10, further comprising heat radiating parts connected to the metal wiring layers and to which the residual heat is transferred.

12. An inkjet print head chip used usable in an inkjet print head, comprising:

a semiconductor substrate;

a plurality of MOSFETs formed on the semiconductor substrate;

wiring layers which apply a signal to the plurality of MOSFETs;

a first insulation layer formed on the wiring layers;

a plurality of heaters formed on the first insulation layer, and activated by the MOSFETs to heat ink;

metal wiring layers formed in the first insulation layer underneath the plurality of heaters and which externally some of the heat generated by the plurality of heaters; and

a second insulation layer formed on the plurality of heaters to prevent the plurality of heaters from coming into contact with the ink.

13. The inkjet print head chip of claim 12, further comprising heat radiating parts to which the metal wiring layers are connected.

14. The inkjet print head chip of claim 13, wherein the heat radiating parts are dimensioned to maximize their surface areas so as to facilitate heat radiation.

15. The inkjet print head chip of claim 13, further comprising heating parts connected to the metal wiring layers and which heat the metal wiring layers.

16. The inkjet print head chip of claim 15, wherein the metal wiring layers transfer heat generated from the heating parts to the ink surrounding the plural heaters to pre-heat the ink.

17. The inkjet print head chip of claim 15, wherein the plural heaters have two sides and two heat-radiating parts are respectively provided on the two sides of the plural heaters.

18. The inkjet print head chip of claim 12, wherein the heaters are formed of TiN.

19. The inkjet print head chip of claim 12, wherein the metal wiring layers are formed of one of aluminum (Al) and an aluminum alloy.

20. The inkjet print head chip of claim 12, wherein the first insulation layer includes two layers, an upper layer on which the metal wiring layers are mounted is formed of SiO_2 and a lower layer is formed of BPSG.

21. The inkjet print head chip of claim 12, wherein the second insulation layer is formed of SiN.

22. The inkjet print head chip of claim 12, wherein the plural heaters are provided in two adjacent linear arrays.

23. The inkjet print head chip of claim 12, wherein the metal wiring layers absorb residual heat after the heaters are deactivated to decrease an amount of residual heat transferred to the ink and to decrease a time required for the plural heaters to return to a ready state.

24. The inkjet print head chip of claim 23, further comprising heat radiating parts connected to the metal wiring layers and to which the residual heat is transferred.

25. An inkjet print head chip usable in an inkjet print head, comprising:
a semiconductor substrate;
a plurality of MOSFETs formed on the semiconductor substrate;
first metal wiring layers which apply a signal to the plurality of MOSFETs;
a first insulation layer formed on the metal wiring layers;

a plurality of heaters formed on the first insulation layer, and activated by the MOSFETs to heat ink;

second metal wiring layers formed in the first insulation layer underneath the plurality of heaters, and externally radiate some of the heat generated by the plurality of heaters;

a second insulation layer formed on the plurality of heaters and preventing the plurality of heaters from coming into contact with the ink; and

a shock-blocking layer formed on the second insulation layer which blocks shocks occurring when the bubbles resulting from the heated ink collapse.

26. The inkjet print head chip of claim 25, further comprising heat radiating parts to which the second metal wiring layers are connected.

27. The inkjet print head chip of claim 26, wherein the heat radiating parts are dimensioned to maximize their surface areas so as to facilitate heat radiation.

28. The inkjet print head chip of claim 26, further comprising heating parts connected to the second metal wiring layers and which heat the second metal wiring layers.

29. The inkjet print head chip of claim 28, wherein the second metal wiring layers transfer heat generated from the heating parts to the ink surrounding the plural heaters to pre-heat the ink.

30. The inkjet print head chip of claim 28, wherein the plural heaters have two sides and two heat-radiating parts are respectively provided on the two sides of the plural heaters.

31. The inkjet print head chip of claim 25, wherein the shock-blocking layer is formed of two layers, an upper layer formed of TiN, and a lower layer formed of Ti.

32. The inkjet print head chip of claim 25, wherein the first insulation layer includes two layers, an upper layer on which the metal wiring layers are mounted is formed of SiO_2 and a lower layer is formed of BPSG.

33. The inkjet print head chip of claim 25, wherein the second insulation layer is formed of SiN.

34. The inkjet print head chip of claim 25, wherein the plural heaters are provided in two adjacent linear arrays.

35. The inkjet print head chip of claim 25, wherein the second metal wiring layers absorb residual heat after the heaters are deactivated to decrease an amount of residual heat transferred to the ink and to decrease a time required for the plural heaters to return to a ready state.

36. The inkjet print head chip of claim 35, further comprising heat radiating parts to which the residual heat is transferred.

37. An inkjet print head, comprising:

a head body in which ink is contained;

an inkjet print head chip mounted on a bottom of the head body and having plural heaters heating ink contained in the head body; and

a nozzle plate mounted on the bottom of the inkjet print head chip and formed with plural nozzles firing ink heated by the plural heaters,

wherein the inkjet print head chip comprises

a semiconductor substrate having plural switching devices formed therein, and

metal wiring layers formed between the plural heaters and the switching devices, which externally radiate some of the heat generated from the plural heaters, and

the plural heaters provided on the upper sides of the switching devices, and activated by the plural switching devices to heat the ink.

38. The inkjet print head of claim 25, further comprising heat radiating parts to which the metal wiring layers are connected.

39. The inkjet print head chip of claim 38, wherein the metal wiring layers transfer heat generated from the heating parts to ink surrounding the plural heaters to pre-heat the ink.

40. The inkjet print head of claim 26, further comprising heating parts connected to the metal wiring layers and which heat the metal wiring layers.

41. The inkjet print head chip of claim 25, wherein the plural heaters are provided in two adjacent linear arrays.

42. The inkjet print head chip of claim 25, wherein the metal wiring layers absorb residual heat after the heaters are deactivated to decrease an amount of residual heat transferred to the ink and to decrease a time required for the plural heaters to return to a ready state.

43. The inkjet print head chip of claim 42, further comprising heat radiating parts to which the residual heat is transferred.

44. An inkjet print head chip, comprising

one or more heater arrays;

one or more metal wiring layers disposed beneath the one or more arrays of heaters, the number of metal wiring layers being equal to the number of heater arrays;

one or more heat radiating parts connected to the one or more metal wiring layers which dissipate heat absorbed by the metal wiring layers; and

one or more heating parts connected to the one or more metal wiring layers which heat the metal wiring layers.

45. The inkjet print head chip of claim 44, wherein the number of heat radiating parts and the number of the heating parts are the same as the number of metal wiring layers.

46. The inkjet print head chip of claim 45, wherein a heat radiating part and a heating part are connected to opposing ends of each metal wiring layer.

47. The ink jet print head chip of claim 44, further comprising a logic part which controls the heaters.

48. The inkjet print head chip of claim 47, further comprising an address part which transfers control signals from the logic part to one or more MOSFETs which control an electric current flowing to the heaters according to the control signals from the logic part.

49. The inkjet print head chip of claim 44, further comprising a shock absorbing layer disposed above the heaters to absorb shocks resulting from bubble bursts in the ink.

50. The inkjet print head chip of claim 44, wherein the one or more metal wiring layers absorb residual heat from the heaters and transfer the absorbed heat to the one or more heat radiating parts.

51. The ink jet print head chip of claim 44, wherein the one or more metal wiring layers transmit heat generated by the heating parts to ink surrounding the heaters.

52. An inkjet print head chip comprising:

an ink heating section which heats a volume of ink to form bubbles in the ink when activated; and

a heat transfer section which absorbs residual heat from the ink heating section after the ink heating section is deactivated and transfers the absorbed residual heat to a heat sink and transfers heat generated by the ink pre-heating section to the ink proximate to the ink heating section so as to pre-heat the ink proximate to the ink heating section.

53. An inkjet print head chip comprising:

ink heaters which heat a volume of ink to form bubbles in the ink when activated; and

an ink pre-heating section having heating parts and metal wiring layers disposed under the ink heaters,

wherein heat from the heating parts is transferred directly to the ink through the metal wiring layers underneath the heaters to pre-heated the ink and thus maintain an ink firing quality of the inkjet print head.